

## ABSTRACT

A sealed package's transmission of oxygen, water vapor, carbon dioxide, or other gas or vapor that is of interest because of its potential adverse effects on the package contents is determined indirectly, based upon the package's transmission of a different gas selected as a test gas. Helium is preferred as a test gas. The package's total transmission of the test gas is separated into its components of leakage through the package seals and permeation through the packaging material itself. The package's leakage of the gas of interest is determined based on its leakage of the test gas, in accordance with the molecular weights of the gases. The package's permeation of the gas of interest is determined based on its permeation of the test gas, in accordance with data correlating the permeation of the gas of interest and permeation of the test gas for the materials from which the package is made, and with package structure data relating to the size, shape, and disposition of the materials from which the package is made. The package's total transmission of the gas of interest is determined by adding its leakage and permeation components so determined. Such data may be used with other data to determine a packaged product's shelf life or its sensitivity to a gas of interest.